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Tuna Newsletter

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National Marine Fisheries Service
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National Marine Fisheries Service

- **Southwest Region**
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Wes Parks, Editor

THE U.S. CANNED-TUNA INDUSTRY IN FIRST-QUARTER 1989

Wes Parks, SWFC
Pat Donley, SWR

Sixty-three vessels of the U.S. tropical tuna purse seine fleet were at sea at least one day during the first quarter of 1989, down five vessels from the number active in the first quarter of 1988 (Table 1). Total capacity at sea was down 5%.

Table 1. Number of active U.S. purse seine vessels and capacity (short tons) in the first quarter of 1989 and 1988.

AREA	1989	1988
	No. of vessels	
W. ATL	0	0
E. PAC	32	40
W. PAC	31	28
TOTAL	63	68
	Capacity	
W. ATL	0	0
E. PAC	29,925	38,795
W. PAC	39,675	34,675
TOTAL	69,600	73,470

Receipts of all tuna species totaled 124,630 short tons (st) at U.S. canneries during the first quarter of 1989, up 5% from both first-quarter 1988 and the recent long-term (1984-1988) average (Table 2). First-quarter deliveries from domestic sources were up 3% from 1988; imports were up 7%.

Skipjack was the largest component of first-quarter, raw tuna deliveries, comprising 43% of the total.

The western Pacific Ocean was the principal fishing area for tuna delivered to U.S. canneries in the first quarter of 1989, contributing 41% of total receipts (Fig. 1a). The 1988 pattern closely repeats both the 1987 and the longer-term (1984-1987) average patterns.

The western Pacific was also the principal source of first-quarter 1989 albacore deliveries, contributing 36% of the total (Fig. 1b). The eastern Atlantic contributed slightly less, followed by the Indian Ocean. This repeats the 1988 and longer-term (1984-1988) patterns.

The western Pacific was the major source of skipjack tuna in U.S. cannery receipts, contributing 60% of the total (Fig. 1c). This pattern follows both 1988 and longer term distributions of skipjack receipts by ocean area.

The eastern Pacific was the source of 71% of U.S. cannery receipts of yellowfin tuna in first-quarter 1989 (Fig. 1d). The 1989 pattern repeats those of 1988 and the longer term.

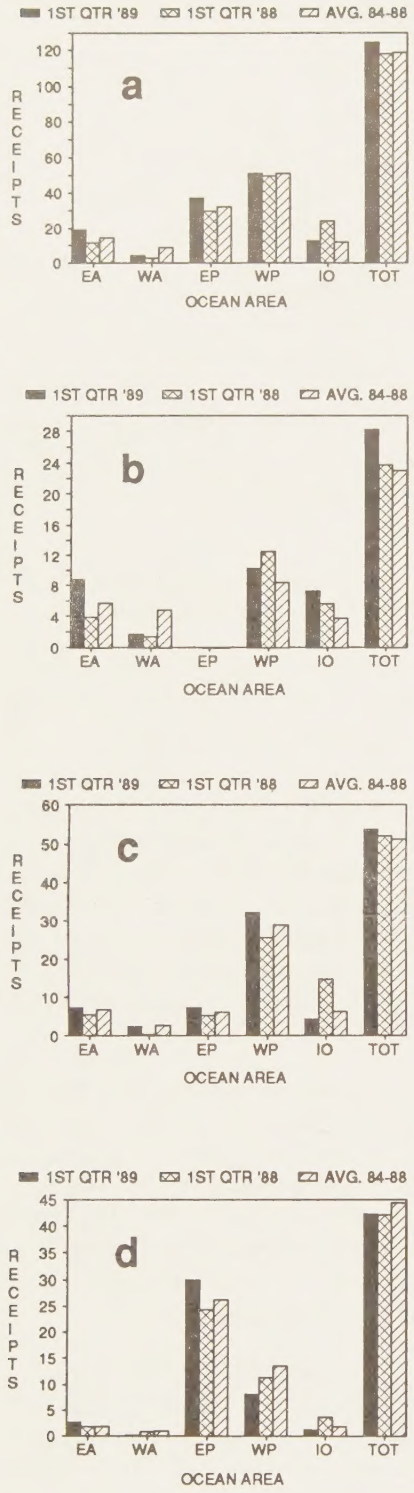

Fig. 1. Receipts (1000 short tons) of raw tuna by U.S. canneries by areas of capture in first-quarter 1989, 1988 and the recent (1984-1988) average. (a) total receipts. (b) receipts of albacore. (c) receipts of skipjack. (d) receipts of yellowfin (includes small amounts of bigeye, blackfin and bluefin).

Tuna fisheries of ten nations provided more than 90% of the raw, frozen tuna imported to U.S. canneries in the first quarter of 1989 (Table 3). Principal suppliers were Taiwan, South Korea and Venezuela.

Contract prices for domestically caught raw tuna delivered to U.S. canneries in American Samoa and Puerto Rico in first-quarter 1989 were lower compared to 1988 (Tables 4, 5). Typically, actual prices paid to U.S. domestic contract vessels are adjusted depending on temperature, salt content and physical condition of the fish at the time of unloading. Prices paid to non-contract domestic and foreign vessels varied according to market conditions.

Weighted-average ex-vessel prices paid by canners for domestically caught raw skipjack and yellowfin tuna decreased in first-quarter 1989 from prices paid for

Table 2. U.S. cannery receipts (short tons) of domestic and imported raw tuna by species in the first quarter of 1989 and 1988 and the recent (1984-1988) average.

		SPECIES[1]			
YEAR	SOURCE	ALB	SJ	YF[2]	TOTAL
1989	Domestic	1,973	26,468	21,178	49,619
	Imported	26,373	27,479	21,149	75,001
	Total	28,346	53,947	42,327	124,620
1988	Domestic	1,454	21,058	25,751	48,263
	Imported	22,397	31,081	16,531	70,009
	Total	23,851	52,139	42,282	118,272
Avg 84-88	Domestic	316	25,606	29,132	55,054
	Imported	22,768	25,831	15,285	63,884
	Total	23,084	51,437	44,418	118,938

[1] ALB=albacore; SJ=skipjack; YF=yellowfin.
[2] Includes a small amount of bigeye, blackfin and bluefin tuna.

Table 3. U.S. cannery imports (short tons) of raw tuna by species and flag of catcher vessel in the first quarter of 1989 and totals for first quarter 1989 and 1988.

	SPECIES[1]				
COUNTRY	ALB	SJ	YF[2]	1989	1988
Taiwan	18,547	715	396	19,658	15,460
S. Korea	3,615	5,409	1,921	10,979	11,825
Venezuela	0	1,860	7,755	9,615	4,152
Ghana	0	5,937	2,551	8,488	5,939
Vanuatu	0	2,625	1,864	4,489	2,059
France	0	3,052	734	3,786	12,106
Ecuador	0	252	2,698	2,950	711
Spain	0	2,388	493	2,881	7,243
Panama	958	439	1,290	2,687	1,132
Japan	2,489	0	0	2,489	3,678
Other	764	4,802	1,413	6,979	5,704
Total	26,373	27,479	21,149	75,001	70,009

[1] ALB=albacore; SJ=skipjack; YF=yellowfin.
[2] Includes a small amount of bigeye, blackfin and bluefin tuna.

Table 4. Contract price (U.S. dollars per short ton) for raw skipjack and yellowfin tuna for delivery to U.S. canneries in America Samoa by U.S. vessels departing on trips in first quarter of 1989 and 1988.

	SKIPJACK		YELLOWFIN[1]	
SIZE CLASS (lbs)	**1989**	**1988**	**1989**	**1988**
First quarter				
20 +	-	-	1045-1065	1200
7.5 to 20	835-875	1050	865-880	1060
4 to 7.5	760-790	1000	760-790	1010
3 to 4	565-595	800	565-595	800
3 -	325-335	525	325-335	525

[1] Includes a small amount of bigeye, blackfin and bluefin tuna.

Table 5. Contract price (U.S. dollars per short ton) for raw skipjack and yellowfin tuna for delivery to U.S. canneries in Puerto Rico by U.S. vessels departing on trips in first quarter of 1989 and 1988.

	SKIPJACK		YELLOWFIN[1]	
SIZE CLASS (lbs)	**1989**	**1988**	**1989**	**1988**
First quarter				
20 +	-	-	1045-1065	1200
7.5 to 20	850-885	1075	880-910	1075
4 to 7.5	770-800	1010	770-800	1010
3 to 4	575-605	800	575-605	800
3 -	325-335	525	325-335	525

[1] Includes a small amount of bigeye, blackfin and bluefin tuna.

the same time period in 1988 but remained higher than the recent five-year average (Table 6). The downward trend in contract ex-vessel prices was reflected in first-quarter average prices which decreased 20% for skipjack and 8% for yellowfin as compared to first-quarter 1988. However, the average price for skipjack was 10% higher than the 1984-88 average price; the average price for yellowfin was 12% higher.

Imports of canned tuna to the U.S. in first-quarter 1989 exceeded both 1988 imports and recent long-term (1984-1988) average imports (Fig. 2). Cumulative 1989 imports of canned tuna not in oil, 131 million pounds, exceeded cumulative 1988 imports by 21%. Cumulative imports exceeded recent average cumulative imports by 71%. Imports of canned tuna to the U.S. in excess of an annual quota are subject to increased duty.

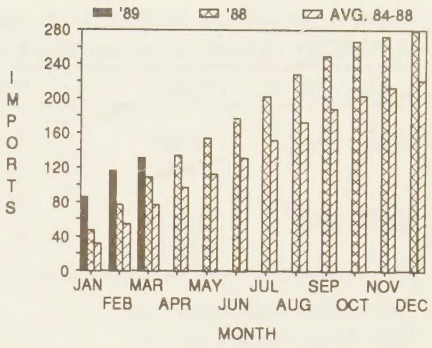

Fig. 2. Cumulative monthly imports (million lbs.) of canned tuna not in oil to the U.S. through the first-quarter 1989, 1988 and average (1984-1988).

The 1989 quota closed on January 25, the earliest closure on record. By the end of the quarter, imports exceeded the quota of 76,734,833 million pounds by 71%.

Imports from six nations contributed more than 98% of U.S. canned tuna imports in the first quarter of 1989. Thailand was the leading supplier, providing 74% of the total. First-quarter imports were valued at $160 million.

Reported wholesale prices for canned tuna were mixed in first-quarter 1989; prices increased for some packs and decreased for others (Table 8). Wholesale list prices asked by canneries and brokers for canned product are also a function of many variables. Though actual wholesale price for any particular transaction is not

Table 6. Weighted-average ex-vessel prices (U.S. dollars per short ton) paid for domestically caught raw tuna delivered to U.S. canneries by species in the first quarter of 1989, 1988 and the recent (1984-1988) average.

	SPECIES[1]	
YEAR	**SJ**	**YF[2]**
1989	816	990
1988	1015	1078
AVG. 1984-88	745	887

[1] SJ=skipjack; YF=yellowfin.
[2] Includes a small amount of bigeye, blackfin and bluefin tuna.

Table 7. Quantity (1000 standard cases) and value (1000 U.S. dollars) of U.S. imports of canned tuna by form and country in first-quarter 1989.

Country	Not in Oil Light Meat	Not in Oil White Meat	In Oil	TOTAL
Thailand	4,773	547	-	5,320
Philippines	807	11	-	818
Taiwan	156	440	-	596
Indonesia	166	34	-	200
Ecuador	89	9	-	98
Spain	-	trace	4	4
Other	105	57	3	165
Total	6,096	1,098	7	7,201

Table 8. Wholesale list price (U.S. dollars per case) in California for tuna canned in water for representative case packs in the first quarter of 1989 and 1988.

CASE PACK	YEAR	ADVERTISED LABEL	PRIVATE LABEL
White meat[1]	1989	64.50 - 67.00	50.00 - 52.00
	1988	59.50 - 63.75	51.00 - 52.00
Light meat[2]	1989	42.45 - 45.00	26.50 - 28.00
	1988	42.45 - 45.00	30.00 - 32.50

[1]White Meat: solid, 12.5oz (24)
[2]Light Meat: chunk, 6.5oz (48)

known, the asking price reported periodically by cannery representatives and brokers is an index of wholesale price.

Doug Prescott, SWFC, Mike Thabault, SWR and especially Diane Pickelsimer, SWFC contributed to this article.

HAWAII AKU FORECAST FOR 1989 ISSUED

Chris Boggs, SWFC

NMFS forecasts the 1989 catch rate of Hawaii aku (skipjack tuna) at 2,200 lb. of large aku per day. The forecast is based on sea surface temperatures corrected for an industry imposed landing-limit. The temperature-based, uncorrected forecast is for a catch rate of 3,200 lb. of large aku per boat, per day fished in the pole-and-line baitboat fisheries. This is up 45% from the 1988 forecast (Fig. 1). Large aku are predicted to make up 58% (by weight) of the catch in 1989.

The uncorrected forecast is corrected to account for a landings limitation imposed by the industry on itself to avoid flooding the market. Assuming a 450,000 lb/month market limit, the corrected forecast is about 2,220 lb. of large aku per boat, per day fished. Large aku are forecast to make up 52% of the total aku catch. The corrected catch rate prediction for all sizes is 4,000 lb. per boat, per day fished, and the total baitboat catch should be about 4 million lb.

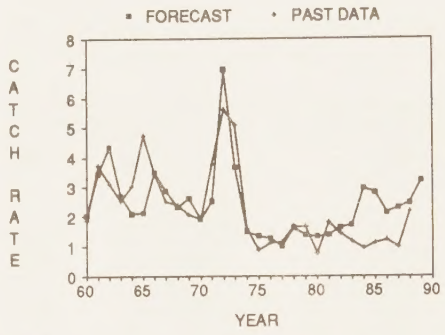

Fig. 1. Uncorrected forecast and actual annual catch rate (1000 lb per boat, per day fished) of large aku in the Hawaiian bait-boat fishery, 1968-1988, and the 1989 forecast rate.

The NMFS forecast is based on sea surface temperature isotherms east of Hawaii. Many things affect daily catch of skipjack tuna, but until the closure of the tuna cannery in 1984, movements of these isotherms statistically accounted for a large percentage of the year-to-year changes in the availability of large aku. Since then, forecasts have overestimated actual catch rates. Actual total baitboat landings of aku averaged only about 450,000 lb/month during the period of peak abundance from May through September 1988. While the uncorrected forecast for 1988 predicted an average of 620,000 lb/month. This suggests that the market will only handle about 450,000 lb of aku per month at a good price (Fig. 2).

The catch in the first 3 months of 1989 was only about 75% of the forecast. In contrast, the first-quarter catches in 1987 and 1988

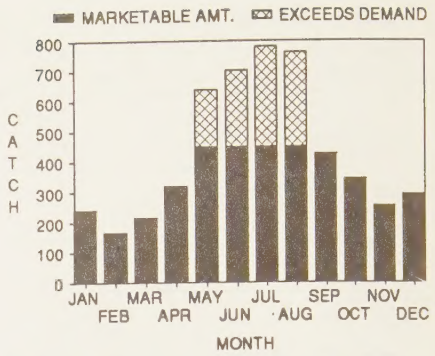

Fig. 2. Forecast monthly catch and demand (1000 lb) in 1989.

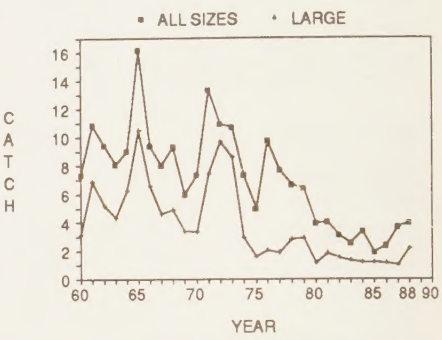

Fig. 3. Corrected forecast and actual total skipjack catch (million lb) 1960-1988.

were abnormally high. Total catch of the pole-and-line baitboat fishery has increased each year since 1985 (Fig. 3). Last year the catch rate of large aku was almost as high as the uncorrected forecast (Fig. 1).

INTER-AMERICAN TROPICAL TUNA COMMISSION HOLDS 46TH MEETING

Staff, Inter-American Tropical Tuna Commission

The Commission held its 46th meeting in Paris, France, on May 10-12, 1989. Mr. Dominique Piney of France served as Chairman. Representatives of all five member governments attended the meeting, as did observers from 11 other governments and several international organizations.

The IATTC research program, which is in its 39th year, was

reviewed by Dr. James Joseph, Director. Program objectives are to conduct scientific studies of the tropical tunas and billfishes of the eastern Pacific Ocean (EPO) and, when necessary, to make recommendations to member nations for management of these species. The IATTC Convention specifies that the goal of management is to achieve the maximum sustainable yield in weight of fish.

In 1976 the IATTC's duties were broadened to include problems arising from the tuna-dolphin relationship in the EPO. As its objectives, it was agreed that "the Commission should strive (1) to maintain a high level of tuna production and also (2) to maintain [dolphin] stocks at or above levels that assure their survival in perpetuity, (3) with every reasonable effort being made to avoid needless or careless killing of [dolphins]."

The combined catch of all tunas in the EPO in 1988 was excellent, totalling 428,000 short tons (st) (Table 1). The EPO yellowfin catch, 317,000 st, was the greatest on record, exceeding the previous high taken in 1987 by 15,000 st. The yellowfin catch in the Commission's Yellowfin Regulatory Area (CYRA) was 295,000 st, also a record, exceeding the previous high, also taken in 1987, by 20,000 st.

Skipjack catches, which were not particularly good in 1986 and 1987, were significantly greater in 1988, when 94,000 st were taken.

Mexico made the greatest tuna catches in the EPO in 1988, followed by the United States, Venezuela, and Ecuador.

The EPO catch of yellowfin during the early part of 1988 was taken almost entirely inside the CYRA, primarily in nearshore areas, then later in the year the center of the fishery moved offshore. Skipjack catches were concentrated in a near-coast band about the equator and off the north coast of Mexico.

Status of EPO yellowfin is indicated by catch rate trends and results of cohort and yield-per-recruit analyses and production modeling. The population of yellowfin in the CYRA is probably above the optimum level in 1989 and should be capable of supporting catches in the range of 265,000-280,000 st. In 1986, the CYRA stock of yellowfin reached its greatest level of abundance, as indicated by catch per days fishing (CPDF), since the early 1970s, and is now declining (Fig. 1). The increase was the result of low catches in 1982 and 1983 which permitted the population to increase; the recent decline is due to large catches during the 1985-1988 period. CPDFs for 1984-1988 are greater than expected, due probably to (1) above-average recruitment, (2) less effort expended in areas where skipjack occur, related to lower ex-vessel prices for small tunas, and (3) the larger average size of yellowfin taken, which resulted in a greater yield per recruit.

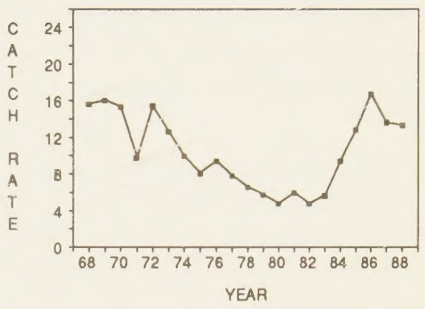

Fig. 1. Catch-per-day-fishing (short tons per day) by class-6 purse-seiners of yellowfin in the CYRA, 1968-1988.

The production model estimate of average maximum sustainable yield (AMSY) of the stock, using long-

Table 1. Estimates of catches (short tons) of tunas in the EPO in 1988, by species and vessel flag.

	SPECIES[1]									
	YF	YF	SJ	BE	BL	BO	ALB	BSJ	Other[2]	
FLAG	CYRA	Outside								TOTAL
Ecuador	29,475	0	13,480	319	0	7	0	1,212	955	45,448
Japan	1,099	0	0	0	0	0	0	0	0	1,090
Mexico	105,849	8,509	21,262	0	493	6,426	0	10	89	142,638
USA	84,785	12,440	38,116	146	996	3,677	301	146	1,350	141,957
Venezuela	44,441	598	11,738	137	58	0	0	30	44	57,046
Others[3]	29,795	85	9,789	266	0	0	0	70	225	40,230
Total	295,435	21,632	94,385	868	1,547	10,110	301	1,468	2,663	428,409

[1]Species: YF yellowfin, SJ skipjack, BE bigeye, BL bluefin, BO bonito, ALB albacore, BSJ black skipjack.
[2]Includes mackerel, sharks, other tunas, and miscellaneous fishes.
[3]Includes Panama, Spain, and Vanuatu. This category is used to avoid revealing the operations of individual vessels.

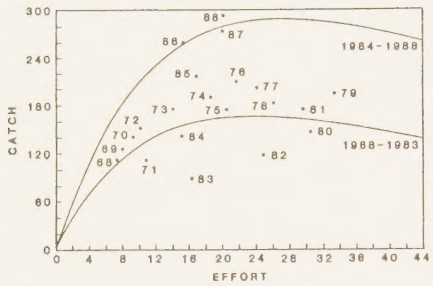

Fig. 2. Relationships between effort (thousands of days) and catch (thousands of st) for the yellowfin fishery inside the CYRA for the generalized stock production (asymmetrical) model with q set at 0.000039. Relations are shown for two periods, 1968-1983 and 1984-1988.

term (1968-1988) series of data, is about 165,000 tons (Fig. 2). Until recently the model predicted events in the fishery fairly well, but for the last three years it has not. Using only 1984-1988 data, AMSY for 1989 is estimated to be about 288,000 tons. Model-predicted events based on only the later data correspond better to recent events in the fishery.

Yield-per-recruit analysis indicates that productivity of EPO yellowfin has increased since 1985. Increased productivity is probably the result of changes in the size composition of the catch and of changes in recruitment. The average size of the fish caught was substantially greater during 1985-1988 than during previous years, and this increased the yield-per-recruit by about 25%. The recruitment has been significantly greater during the 1984-1988 period than during earlier years, and this accounts for an increase in the production of nearly 40%.

These analyses demonstrate that the stock of yellowfin in the CYRA is probably above the optimum level and can sustain a catch about 5-10% less than that of 1988, or about 265,000-280,000 st. With current available fishing capacity there is little or no danger of overfishing, but the IATTC staff recommend a minimum quota of 220,000 st, with provision for increasing it at the discretion of the Director by two increments of 30,000 tons each. If the recruitment is average and the age-specific fishing mortality does not change, the recommended 1989 catch will not adversely affect the population, and good fishing should continue through this decade. However, if the recruitment decreases or the fish are harvested at smaller sizes, the catches will decrease.

The recommended 1989 yellowfin quota is the latest in a series beginning in 1962. The IATTC staff first recommended that an annual quota be set on the catch of yellowfin in the CYRA in 1962, and member governments first reached agreement on a yellowfin quota in 1966. Agreement was reached on a quota for every year from 1966 through 1986. IATTC did not recommend a quota for 1987 because, due primarily to exceptionally high levels of recruitment in 1984 and 1985, the abundance of yellowfin appeared to be at its highest level in recent years. In 1988, the Commission staff recommended a yellowfin quota of 190,000 st for 1988, with the option to increase this limit by two increments of 30,000 st each to allow for the possibility that the staff had under-estimated the stock abundance.

There is no scientific evidence to suggest that management of catches of skipjack is necessary. The catch of skipjack in the eastern Pacific varies considerably from year to year. EPO skipjack are thought to be the result of spawning in the central or western Pacific, which may also supply skipjack to fisheries in the offshore portions of the eastern Pacific, the central Pacific, and the western Pacific. Production models are therefore not usable to assess status of EPO skipjack.

Yield-per-recruit analysis does not indicate any need for the management of skipjack. The model indicates that the maximum yield-per-recruit from adolescent skipjack in the eastern Pacific Ocean can be obtained by fishing the individuals over about 30 cm in length as hard as possible. Conceivably this could reduce the recruitment in subsequent years, but this seems unlikely from what is known of the spawning behavior and population structure.

Other business conducted at the 46th meeting included discussion of the status of other tuna species (bigeye, bluefin), the IATTC tuna-dolphin program and the status of negotiations regarding EPO tuna management arrangements. Dr. Joseph and Dr. Martin Hall, head of the tuna-dolphin program, reviewed the tuna- dolphin program including research on estimating incidental dolphin mortality and of their relative abundance. Chairman Piney gave a brief, non-technical review of the Tuna-Dolphin Workshop held in San Jose, Costa Rica, in 1989. He said that evidence presented at the San Jose meeting showed that the major stocks of dolphins had been stable since 1975 and that the total mortality of dolphins had decreased during the last 3 years by about 40%.

Dr. Joseph reviewed discussions of various groups concerning arrangements for tuna management in the eastern Pacific, none of which has resulted in ratification of a new treaty.

The 1990 meeting will be held in Washington, D.C., on a date to be decided later. Commission delegates agreed that a Commissioner from the United States would be Chairman in 1990. U.S. Commissioner Fullerton indicated that a person for this office would be designated later.

STATUS OF TUNA FISHERIES IN THE WESTERN AND CENTRAL PACIFIC OCEAN

John Hampton, South Pacific Commission

The area served by the South Pacific Commission (SPC) extends from Palau in the west through Micronesia, Melanesia and Polynesia to the Pitcairn Islands. The area has a population of over five and a half million people and covers a total area of about 30 millon square kilometers, only about two per cent of which is land. Fishing has traditionally played an important role in the lives of many Pacific islanders; subsistence and artisanal fishermen for many decades have relied heavily on tuna and other small pelagics for food, income and employment. Since the widespread acceptance of 200-mile exclusive economic zones (EEZ's), local control of marine resources has become more certain and tuna fisheries have taken on a new importance for Pacific Island countries. Licensing of fleets of distant-water fishing nations (DWFN) to fish for tuna in the EEZs of a number of countries has created a new, important source of foreign exchange revenue which, for some island nations, is the largest single such source. Several countries have also invested in commercial tuna fishing vessels and associated shore- based facilities, such as markets and canneries, in order to create employment, generate foreign exchange and facilitate training and transfer of fishing and related technologies.

Locally based fisheries. In many Pacific Island countries, artisanal fishermen take tuna for consumption and, where markets are accessible, for sale. Skipjack and, to a lesser extent, juvenile yellowfin and possibly bigeye are the main species taken. Tuna are caught mostly from small boats by trolling and pole-and-lining using lures made from mother-of-pearl shell. Although reliable statistics are not available, total catches by artisanal fishermen in the region are estimated to be less than 10,000 metric tons (mt) annually.

Most locally based industrial tuna fisheries in the Pacific Islands region have been developed with the assistance of foreign countries, most frequently Japan, either as joint venture arrangements or as aid packages. A domestic pole-and-line fishery in Papua New Guinea began in 1970 in joint venture with Japan and averaged nearly 30,000 mt annually between 1971 and 1981. Operations were suspended in early 1982 because of unfavorable economic conditions, and apart from a brief revival in 1984-1985, have not been reestablished.

Currently, the major locally based industrial tuna fisheries in the region are based in the Solomon Islands and Fiji. The Solomon Islands fishery began in the early 1970's, and is currently comprised of 34 pole-and-line vessels, a group seining operation (under charter from Japan) and two recently acquired 500 gross registered ton (grt) class single purse-seiners. Two locally based longliners also operate. The total tuna catch in 1987 was approximately 32,000 mt (Table 1). In Fiji, a skipjack pole-and-line fishery has operated since 1976 and currently consists of 10 vessels. During 1989, a chartered Filipino purse-seiner also fished.

Fishing by distant water fishing nations. Foreign involvement in commercial fishing in the Pacific Islands dates back to the early 1920's, when Japanese pole-and-line fleets began to establish themselves in Micronesia. By the early 1950s, Japan had reestablished its distant-water fishing capability, which had been severely depleted during World War II, with pole-and-line fishing in Micronesia and longlining throughout the Pacific Islands region. Longline fleets from the Republic of Korea and the Republic of China soon followed Japan, initially targeting albacore for canning.

Purse seining was introduced by the Japanese in the mid 1970's as a response to rising fuel prices and other problems in the pole- and-line fishery. This method proved very successful, which encouraged other countries, such as the Republic of Korea and the Philippines, to follow suit. In the early 1980's, the purse-seine catch began to expand with the influx of U.S. seiners into the western Pacific, encouraged by the reported high catch rates, few problems with incidental dolphin mortality and reduced yellowfin abundance in the eastern Pacific.

The DWFN pole-and-line fishery. The DWFN pole-and-line fishery is a totally Japanese activity, the estimated 1987 catch of which was 78,000 tons (Table 1) at a catch per unit of effort (CPUE) of 7.7 tons per day. The catch is comprised almost entirely of skipjack, with a very small amount (2% in 1987) of yellowfin. It is estimated that about 100 vessels were active in the Pacific Islands region during 1987. Catch and effort data from 77 of these vessels were received by SPC.

Japanese pole-and-line effort is concentrated in Micronesia during the first quarter, with most activity in the EEZ of Federated States of Micronesia. During the rest of the year, activity in the region is reduced. February, March and April are the months with highest effort (Fig. 1). Activity is much lower during other months as most vessels move to fishing grounds closer to Japan or to international waters southwest of Hawaii.

Pole and line CPUE appears to have increased from about 3 tons per day in 1978 to a high of over 8 tons per day in 1986 (Fig. 2). This increase is probably due to the bet-

Table 1. Estimated total catch (metric tons) and effort in the western and central Pacific Ocean in 1987.

Vessel Nationality	Days Fished	SKJ[1]	YFT	BET	ALB	BUM	MLS	BLM	SWO	SHK	OTH	TOTAL
Cayman Is.												
PS[2]	260	2080	3272								58	5410
Indonesia												
PS	210	2841	531									3372
Fiji												
PL	1400	4682	462									5144
Japan												
PS	5724	86678	34969	610							1	122258
LL	81550		55706	40695	454	5114	220	245	994	147	405	103980
PL	10000	76889	1596								315	78800
Total		163567	92271	41305	454	5114	220	245	994	147	721	305038
Kiribati												
PL	715	242	120								11	373
Panama												
LL	4660	8	1778	2656	262	196	191	2	83	48	16	5240
Philippines												
PS	750	6056	2382	66							166	8670
Solomon Is.												
PS	275	4406	3441								636	8483
PL	7663	23590	239								96	23925
Total		27996	3680								732	32408
ROK												
PS	3600	34196	19287	27							27	53537
LL	29125	12	13018	15112	1568	1807	212	264	368	162	600	33123
Total		34208	32308	15169	1568	1807	212	264	368	162	627	6660
ROC												
PS	2990	14609	2337									16946
LL	23300		1240	3178	3420	2091	264		633	1879	384	13089
Total		14609	3577	3178	3420	2091	264		633	1879	384	30035
Tonga												
LL	196	1	28	14	227				1	11	37	319
Tuvalu												
PL	200	400	40									440
U.S.A												
PS	5945	90084	69616	64	56						10	159830
USSR												
PS	1050	5250	105									5355
Vanuatu												
PS	600	645	60									705
All Nations												
PS	21404	246845	136000	767							898	384510
LL	138831	21	71770	61655	5931	9208	887	511	2079	2247	1442	155751
PL	19978	105803	2457								422	108682
Total		352669	210227	62422	5931	9208	887	511	2079	2247	2762	648943

[1]Species: SKJ skipjack, YFT yellowfin, BET bigeye, ALB albacore, BFT bluefin, BUM blue marlin, MLS striped marlin BLM black marlin, SAI sailfish,, SWO swordfish, SHK shark, OTH other.
[2]Gear: PS purse seine, LL longline, PL pole-and-line.

ter quality of vessels remaining in the fishery. Since the advent of large-scale purse seining in the mid-1970s, the distant-water pole-and-line fleet has declined from over 500 vessels in 1973, to its present status of about 100 vessels, with the older, smaller, less efficient vessels being retired.

The DWFN purse-seine fishery. Approximately 120 purse-seine vessels from 10 countries fished in the SPC region in 1987. The majority of vessels were registered in Japan (about 36) the U.S. (34), the Republic of Korea (about 18) and the Republic of China (about 13), with other active foreign vessels registered in the Cayman Island, Indonesia, the Philippines and the USSR. Locally registered purse-seiners from Solomon Islands and

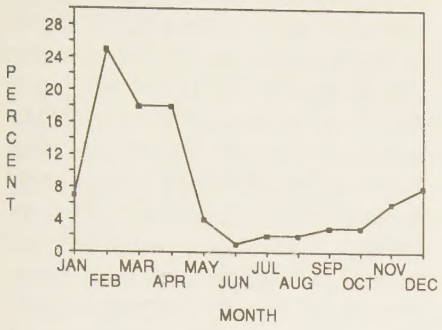

Fig. 1. Average (1974-1987) monthly effort (percent of annual total) in the Japanese pole-and-line fishery in the SPC area.

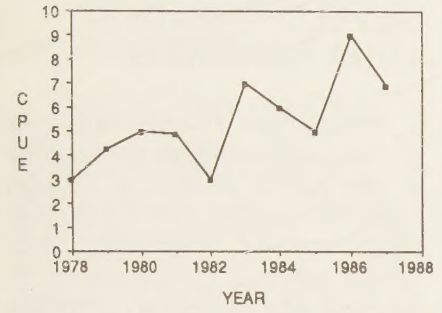

Fig. 2. Skipjack CPUE (metric tons per day) in the Japanese pole-and-line fishery in the SPC area, 1978-1987.

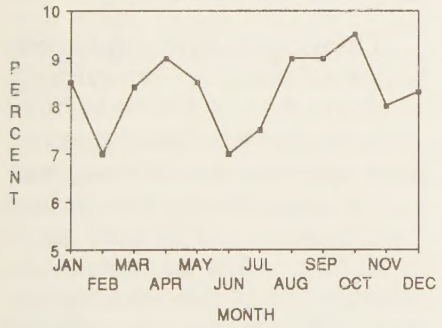

Fig. 3. Average (1984-1987) monthly DWFN purse-seine effort (percent of total) in the SPC area.

Vanuatu also fished in the region. The total 1987 catch by the DWFN purse-seine fleet is estimated to have been 375,000 mt (Table 1) with an overall CPUE of 18.3 mt per day. Both skipjack and yellowfin are taken by purse-seiners, with yellowfin making up 35% of the catch in 1987.

Two distinct methods of purse-seine fishing are evident in the SPC region. The more traditional method involves setting, usually in the early morning, around floating logs (tuna are frequently found aggregating beneath flotsam in the western Pacific). Log schools tend to be mixed skipjack and yellowfin of quite variable size, however, most yellowfin tend to be small (less than 10 kg). The second method, which is becoming increasingly popular with technological advances, involves the capture of free-swimming schools, principally of yellowfin. Individual schools tend to be more uniform in size than log schools, with schools of large yellowfin (greater than 30 kg) commonly caught.

Most purse-seine activity reported to SPC is carried out in the area between 10°N and 5°S and between 135°E and 160°E (the southern EEZ of the Federated States of Micronesia, the northern EEZ of Papua New Guinea and the strip of international waters between the two). This distribution could be somewhat biased by the lack of U.S. data, as some U.S. purse-seiners are thought to fish more to the east than vessels from Japan, the Republic of Korea and the Republic of China.

The purse-seine fishery operates year round in the SPC area (Fig. 3). Vessels tend to fish in Papua New Guinea waters during January and February, moving north into Federated States of Micronesia waters during March-June and then moving back to Papua New Guinea waters for the remainder of the year.

There is no apparent trend in CPUE for either skipjack or yellowfin (Fig. 4), however interpretation of this figure is confounded by the differences among fleets and methods of fishing described above. There does not appear to be any seasonal trend in total CPUE for skipjack or yellowfin, however the CPUE for free-swimming yellowfin schools appears to be highly seasonal, with

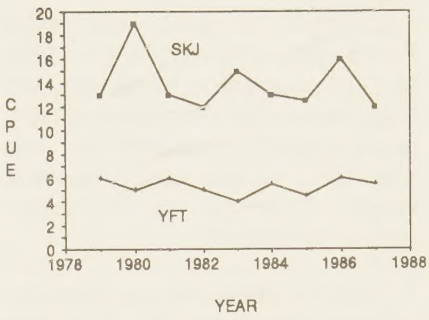

Fig. 4. Skipjack and yellowfin CPUE (metric tons per day) in the DWFN purse-seine fishery in the SPC area, 1979-1987.

highest catch rates being recorded during August-February. This may be related to spawning behavior, as gonad indices have been observed to peak during the third fourth quarters.

The DWFN longline fishery. The principal longline DWFNs in the SPC area are Japan, the Republic of Korea and the Republic of China. An estimated 600 longliners were active in the area during 1987. Coverage of the longline fishery in the SPC data base is relatively poor, particularly south of the equator.

The principal species taken by the longline fishery are yellowfin and bigeye, however significant amounts of albacore and blue marlin are also caught. The total longline catch in the SPC area in 1987 is estimated to have been 156,000 tons with 72,000 tons being yellowfin and 62,000 tons being bigeye (Table 1). The total longline CPUE for the Japanese fishery (for which coverage is best) was 54 kg per 100 hooks.

Two methods of longlining are used in the central and western Pacific, conventional and deep longlining. Conventional longlines fish mainly in the mixed layer above the thermocline, in a depth range of 50-120m, targeting on yellowfin. Deep longlines fish a range of 50-250m which includes the thermocline, the preferred habitat of the

more valuable bigeye. Almost all longlining in the western and central Pacific used conventional gear prior to 1974. Japanese longliners then began to use the deep longline technique and employed both methods until 1983. Since 1984, the deep longling technique has been used almost exclusively.

Longline effort is more widely distributed throughout the SPC area than effort by the surface fisheries. Activity is concentrated in the EEZs of the Federated States of Micronesia, the Marshall Islands, and Papua New Guinea have been the major areas of operation. Based on SPC data, there is a noticeable reduction in longline effort during August-December (Fig. 5). There is no clear seasonal trend in yellowfin CPUE, however bigeye CPUE appears to be slightly higher during October-March.

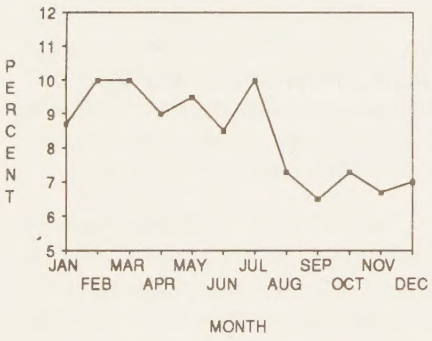

Fig. 5. Average (1984-1987) monthly longline effort (percent of total) in the SPC area.

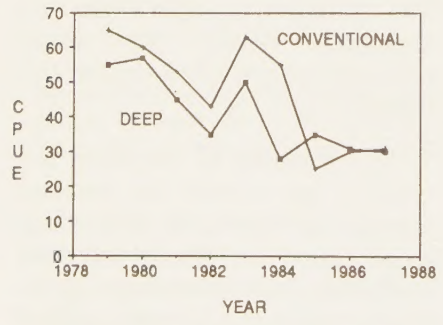

Fig. 6. Yellowfin CPUE (kg per 100 hooks) by deep and conventional longlining in the SPC area, 1979-1987.

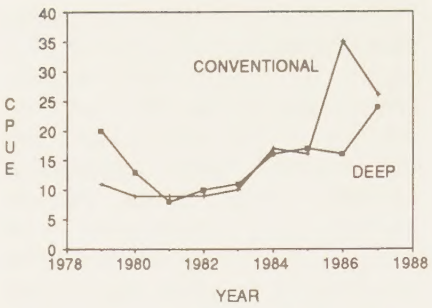

Fig. 7. Bigeye CPUE (kg per 100 hooks) by deep and conventional longlining in the SPC area, 1979-1987.

Longline yellowfin CPUE (SPC data) has fallen since 1978 particularly for conventional longlining (Fig. 6). In contrast, CPUE for bigeye by both conventional and deep longlining has been increasing since 1981 (Fig. 7).

Conclusions. There is currently no evidence that stocks of skipjack and yellowfin available to DWFN surface fisheries have been significantly affected by fishing activity. CPUEs in both pole-and-line and purse-seine fisheries have not declined. It is possible, however, that high CPUEs have been maintained by increases in vessel efficiency. This is certainly the case for the Japanese pole-and-line fishery where skipjack CPUE has been increasing over the past ten years. SPC purse-seine CPUE, which does not include data for the entire fleet, is probably not, at this stage, a useful indicator of relative abundance due to the changing characteristics of vessels in the fleet and the fishing techniques that they employ. A more thorough analysis of purse- seine catch and effort will be possible when data from the U.S. fleet are available.

Based on the data available to SPC, there is some indication that longline yellowfin CPUE has declined in recent years. On face value, the data would suggest that the abundance of large yellowfin has declined, possibly as a result of increased purse-seine activity. However, analyses of more comprehensive data by Japanese scientists indicate a similar decline in yellowfin CPUE during the 1960s and early 1970s, followed by a sharp increase from 1975 to 1978. It is possible that the recent decline in CPUE is simply a reversal of the late 1970s increase, and may even have occurred in the absence of purse seining. A major new tagging project, scheduled to begin in the second half of 1989, should shed light on the question of purse-seine-longline interaction.

RECENT DEVELOPMENTS IN TUNA FISHERIES

Editor's note: The following news articles were compiled from reports of the NMFS Branch of Foreign Fisheries Analysis, Office of International Fisheries, Washington, D.C. Dennis Weidner, Don Jacobson, P. Niemeier and Francisco Quintanilla contributed to these reports with the assistance of other NMFS officials and U.S. Foreign Service officers.

UNITED STATES

U.S. imposes strict regulations to protect dolphins -- Amendments in 1988 to the U.S. Marine Mammal Protection Act (MMPA) impose very strict new measures for the protection of dolphins in the Eastern Pacific Ocean (EPO) tuna purse seine fishery. The amendments require that the United States not import yellowfin tuna or yellowfin products from nations fishing in the EPO tuna purse seine fishery which do not have regulatory and enforcement programs comparable to those of the United States and which have a kill rate of dolphins well in excess of the U.S. fleet. Kill rates of foreign-flag fleets are limited to no more than twice the U.S. rate for the 1989 fishing season and no more than 1.25 times the U.S. rate for the 1990 fishing season and thereafter. Currently only El Salvador is embargoed under the new MMPA.

CARIBBEAN

British Virgin Islands seize U.S. longliner -- British authorities seized the U.S. longliner *Full Moon* on February 23, 1989. The British claimed the vessel was deploying its gear south of St. Thomas in British waters. The British are reportedly conducting aerial patrols as a result of complaints by local fishermen. The *Full Moon's* captain and each crew member was fined $10,000 and the catch was confiscated. The total cost to the vessel owner (fines, fees, and confiscated fish) was reportedly about $100,000.

LATIN AMERICA

Regional tuna talks held in Mexico City -- Several Latin American countries had hoped to sign a regional tuna convention in Lima, Peru during March. The talks leading to the convention had been held under the auspices of the Organizacion Latinoamericana de Desarrollo Pesquero (OLDEPESCA). The participants decided, however, to postpone the meeting of plenipotentiaries and instead hold a technical-level meeting in Mexico City during March. Details on the results of that meeting are unavailable.

Costa Rica and U.S. meet to discuss Eastern Pacific tuna problem -- United States and Costa Rican officials met in San Jose, Costa Rica, on April 6 for bilateral consultations on Eastern Pacific tuna. The U.S. delegation was led by Ambassador Edward Wolfe and the Costa Rican delegation by Director General for Fisheries Eduardo Bravo. Ambassador Wolfe informed Director General Bravo of the recent discussions with Mexico (February 14) regarding new approaches to the Eastern Pacific tuna question and asked him for any thoughts that Costa Rican officials might have. Wolfe also reiterated U.S. support for Costa Rica's decision to rejoin the International Tropical Tuna Commission (IATTC). Bravo explained the current status of Costa Rica's IATTC application. Bravo and other Costa Rican officials also discussed the two treaties that are being considered by Eastern Pacific countries (the Eastern Pacific Ocean Tuna Fishing Agreement (EPOTFA)) and a convention promoted by OLDEPESCA.

U.S.-Mexico tuna talks -- U.S. and Mexican officials met in Mexico City on February 14 for informal discussions on the Eastern Pacific tuna fishery. Secretary Maria de los Angeles Moreno headed the Mexican Delegation and Ambassador Edward Wolfe, Deputy Assistant Secretary for Oceans and Fishery Affairs, headed the U.S. delegation. Ambassador Wolfe initiated the discussions by noting how unfortunate it was that Mexican-U.S. tuna relations have not been characterized by harmony and a common understanding. The U.S. delegation proposed that the two countries consider a new beginning in regional tuna relations. The U.S. also asked Mexico to consider issuing permits to older, "disadvantaged" U.S. tuna vessels in the Pacific and to U.S. longliners in the Gulf of Mexico. The two sides exchanged views on the Eastern Pacific tuna fishery and agreed to meet in the near future for more detailed discussions. The Mexicans agreed to issue licenses to the disadvantaged vessels as they have done in the past, but said that they needed to study the request for longline permits.

NOAA-IATTC hold tuna-porpoise workshop -- The National Marine Fisheries Service (NMFS) and IATTC hosted a workshop on porpoise mortality incidental to the Eastern Pacific tuna purse seine fishery in San Jose, Costa Rica, March 14-16, 1989. Participants reviewed several technical papers and NMFS representatives made a presentation on new U.S. regulations designed to protect porpoises pursuant to the 1988 amendments to the Marine Mammal Protection Act. Regulations affect countries fishing yellowfin tuna in the Eastern Pacific that plan to export to the United States. Representatives from 14 countries (primarily Latin American countries) participated in the workshop.

Costa Rica raises permit fees -- Costa Rica issued new tuna fishing regulations (Decree number 18805) on February 14, 1989, increasing fees for foreign fishermen. Permit fees vary by vessel size. The fee for vessels over 400 net registered ton (NRT) is $120 per NRT for a 60-day period, double the previous fee of $60 per NRT. The Government did not change the annual registration fee of $20 per NRT. Foreign fishermen complain that the new fees are excessive and the U.S. Embassy has expressed concern that higher prices would discourage the purchase of licenses. Costa Rican fishery official Liliana Villalobos indicated, however, that this has been taken into consideration. The Government has ordered enforcement patrols to intensify their surveillance for vessels not complying with the new regulations.

Mexico rules against U.S. Gulf tuna boats-- Mexican tuna companies have criticized the SEPESCA for granting permits allowing U.S. tuna longliners to fish off the Yucatan Peninsula. SEPESCA authorized the Gulf Pesca y Industria (GPI) company on November 23, 1988, to contract with five U.S. vessels along with their captains. A competing company, Atunera Continental (AC), complained that SEPESCA granted GPI permission to contract U.S. vessels, but denied it to other companies. The U.S. vessels arrived at Progresso in December, but the dispute has prevented most of them from operating. The incident has been widely reported in the local press. AC officials raised the issue with Secretary Moreno in early January when she visited Yucatan. AC claimed that former Fisheries Minister Ojeda had pledged that no such

permits would be issued to any company. SEPESCA finally issued a statement on January 24, confirming that five permits were issued to U.S. tuna longliners, but insisted that they were to survey fishing grounds, not to conduct commercial operations. SEPESCA maintains that Mexican companies will not be allowed to contract foreign vessels to conduct actual fisheries in Mexican waters.

Mexico reports record tuna catches for 1988 -- SEPESCA reported a record tuna catch of 124,000 metric tons (mt) in 1988, an increase of over 10 percent. Industry sources report even higher numbers. More than 85 percent of the catch was yellowfin, but most of the increase was due to higher skipjack catches. Exports of frozen tuna in 1988 also set a new record, 76,000 mt of frozen tuna, an increase of 5 percent. Production of canned tuna totaled 23,000 mt close to the 26,000 mt record set in 1985.

FROM THE EDITOR

This issue marks the end of my tenure as editor. In the summer of 1987 I was assigned the task of reorganizing the 15 year-old Tuna Newsletter to better respond to the needs of the Center's tuna constituents, the U.S. industry, fishery researchers and managers. Your comments and a 43% increase in the number of subscribers indicate that the new format is a success.

After eight issues as editor I have taken advantage of an opportunity to take a year's leave of absence to pursue personal interests. I extend my thanks to those of you who contributed so positively to the value of the Tuna Newsletter.

Wes Parks, editor

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